

The Story of the Naval Arctic Research Laboratory

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It was 6 August 1947 — a heavily laden C-46 lumbered over the pierced-metal surface laid on the coarse beach sand and rolled to a stop. Out from the load of freight climbed seven men led by Professor Laurence Irving of Swarthmore College. The sun was still high, for the days were long, it being only about six weeks past the twenty-first of June, and even at midnight the sun was just beginning to touch the northern horizon. For a change the sky was clear, the wind calm, and the sea was free of ice as far as the eye could see. The dull greenish-brown tundra relieved by the myriad of lakes, large and small, stretched southward seemingly without limit toward the Brooks Range over which the aircraft had come. Thus the Arctic welcomed to Point Barrow the first group of scientists that formed the nucleus of what was to become the Arctic Research Laboratory, and later (1967) the Naval Arctic Research Laboratory (NARL) of the Office of Naval Research.

It was a historic occasion, although the little group sweltering in unfamiliar Navy-issued cold-weather clothing did not realize it as they gazed around at the strange environment. The temperature was in the fifties and all around were the noise and hustle of an oil-exploration camp. Tractors churned the soft sand as they hauled equipment to storage areas. Weasels, those small tracked vehicles, so useful in the Arctic, seemed to be scooting in all directions on a variety of missions. The landscape was dotted with fuel drums, that ubiquitous trade-mark of the American developer in out-of-the-way places all over the world. At the beach lay power barges ready for their mission of lightering freight ashore.

Not much attention was paid to the small group of scientists for this was the main supply camp of the Navy's exploration for oil in Naval Petroleum Reserve No. 4 — an operation known as Pet 4 that was in full swing in 1947, after three years of intense activity. The annual ship expedition, called BAREX for Barrow Expedition, was due and first attention was being given to preparations for unloading the ships and hastening them south before the polar ice pack again moved in to the shore.

Thus the Arctic Research Laboratory was launched without any special notice. That Laboratory for a generation has been the major centre for U.S. arctic research. It is the only U.S. laboratory devoted to fulltime support of basic research in the Arctic. From it has come a steady flow of arctic environmental knowledge that has repeatedly stood this nation in good stead. Dr. M. E. Britton at one time pointed out that "one distinguished Canadian has expressed the view that results from the research of a single permafrost program at the Arctic Research Laboratory enabled savings in the cost of construction of the Distant

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Early Warning line greater than all the money spent on the ARL in its entire history."

As time went on the Laboratory was expanded and improved. Many of the organizational and administrative relationships changed and the course of NARL was altered in response to those changes. Some of the changes were unrelated to U.S. research patterns but nevertheless had a major influence on the Laboratory. Examples are the shutting down in 1953 of Pet 4, the oil exploration program, and the assumption of the operation of the facilities by Air Force contractors under Navy permit.

Other changes were intimately related to the progress of U. S. research in general. The Office of Naval Research was new — only about one and a half years old — when ARL came into being under its sponsorship. The Laboratory and the policies that were developed to guide it were important and influential in regard to ONR itself. The Arctic Institute of North America, only a few months older than ONR, has been closely associated with ARL from the start, and the influence has been great on both organizations. The National Science Foundation came into being by Act of Congress in 1950. At that time both ONR and ARL were active, productive organizations. During the early 1960's the NSF developed a large, balanced, integrated antarctic research program, but nothing comparable was achieved in the Arctic nor has yet been achieved. Some speculate that the Arctic was provided for sufficiently by the ONR through ARL. With the International Geophysical Year in 1957-1958 came a small arctic program. Projects under that program were assisted by ARL when they came within its support range.

Following World War II, the University of Alaska embarked on an accelerating course of growth and expansion in many ways; that trend continues under President William R. Wood. The Laboratory became specifically associated with the University of Alaska in 1954 when, under E.N. Patty, the University's third President, and along the lines of negotiations that had been started by the second President, Terris Moore, a contract was entered into between the ONR and the University whereby the University became the operator of ARL and provided the director and staff.

U.S. interest in ice islands, those ghostly wanderers in the Arctic Ocean, broken originally from the ice shelf bordering a part of Canada's Ellesmere Island, began in 1952 with the discovery and occupancy by the Air Force of T-3, Fletcher's Ice Island. Soon continuing programs on ice islands, and occasionally on sea ice, were initiated by the Navy through NARL. Those programs still go on. A colourful chapter in the story of ice-island occupancy and in the record of NARL was the discovery, the use from May 1961 to May 1965, and the dramatic abandonment between Iceland and Greenland of ice island ARLIS II.

Ice-island programs were spurred in 1954 by the east to west transit of the Northwest Passage by the icebreaker, Her Majesty's Canadian Ship *Labrador*, under Captain, now Commodore O. C. S. Robertson (Ret.). Further interest was occasioned by the U. S. Navy's demonstration that the Arctic Ocean can be used by nuclear-powered submarines.

Now, of course, we have the intense interest in oil exploration and develop-

ment in northern Alaska, triggered by the announcement of the significant discoveries by Atlantic Richfield and associated companies. Once again the value of the research over the years through NARL is being demonstrated.

The establishment and early operation of NARL were made possible by the oil exploration of Naval Petroleum Reserve No. 4 from 1944 to 1953. The encouragement and cooperation of the Office of Naval Petroleum and Oil Shale Reserves and of the Bureau of Yards and Docks were unflagging. The help provided was based on the deep-seated conviction of the value of the research effort. Many times support was given at substantial sacrifice and inconvenience of the oil-exploration effort. That confidence in the value of the research program was well placed.

Now about the men who were on the bridge as NARL proceeded through the years — the distinguished men who were its directors. They constitute a unique group. Lest it be thought that the life of the director was at any time a bed of roses, let me assure you that such was not the case. Each of those men was competent, strong, dedicated, and each left his distinctive imprint on NARL and, I expect, vice versa.

And behind the director, back in ONR in Washington, were others equally devoted to the Laboratory and equally key to its well being and progress. On that level were carried on the broad planning and program definition. There were waged some of the critical struggles and there were hammered out some of the arrangements that influenced profoundly the shape and nature of NARL.

Although space allows but a word or two, I want to name some of the people in those two groups and to indicate the nature of the roles they played. First, I give you the key figures who operated from ONR headquarters —

1. A leader in the development of the idea of a laboratory, and its actual initiator, was M. C. Shelesnyak, physiologist, with special interest in stress physiology, thermal regulation, human ecology, and polar research. Shelesnyak was a Lieutenant Commander in the new Office of Naval Research as the ideas began to develop. By early 1947 he was Dr. Shelesnyak, Head, Environmental Biology Branch, Medical Sciences Division, ONR. Shelesnyak reviewed the requirements for Arctic research. Then he related those requirements to the general and specific needs of the Navy. Finally, he came up with a plan consistent with the principles of operation of the ONR, that contained the stated requirements of the Navy bureaus and offices, that was coordinated with Government and non-Government research interests, and that took advantage of the services and facilities of the Navy's oil-exploration camp at Barrow.

2. In the fall of 1949 Dr. John Field, also a physiologist, took over the responsibility of the ARL in the ONR. Shelesnyak had left ONR to open and head the Baltimore Office of the Arctic Institute. Dr. Field at that time was the Head of the Ecology Branch of ONR, and ARL responsibilities were added to his other duties. Field recently had come to ONR from the Physiology Department of Stanford University. To his lot fell the making of a number of changes in the contractual arrangements between the university contractor, by that time the Johns Hopkins University, and ONR as well as several organizational changes within ONR itself. He remained at the helm until June 1951. At that time the responsibility

for ARL was established within the Geography Branch of ONR, but it was visualized as an independent project not a subordinate section of the Branch.

3. Dr. L. O. Quam was Head of the Geography Branch and thus appeared on the scene a man who was identified with the Arctic and with NARL for a long time. Through his efforts on the Washington front the Laboratory weathered many crises, several of which could have resulted in the termination of NARL had it not been for the persistence and continuing effective efforts of Louis Quam. Now he has changed his polarity and currently is Chief Scientist of the U. S. Antarctic Research Program within the National Science Foundation. However, no one doubts his continuing interest in the Arctic and more specifically in NARL.

4. In the spring of 1955 negotiations were begun that by fall were to bring to ONR in Washington Dr. M. E. Britton, botanist, formerly of Northwestern University. He had carried out field work at NARL previously and so already was familiar with the facility. Dr. Quam soon assumed broader responsibilities in ONR and Britton took over the direct jurisdiction of NARL from the Washington end. Much of the record of the stability and the growth of NARL from 1955 has been the direct result of the total dedication, self-sacrifice, and plain hard work of Dr. Britton. He continues to battle for NARL at every turn. It augurs well for the Laboratory that he still is on board.

Now we turn to the other group, the former directors and the present director of NARL.

1. First at the helm, as I have already mentioned, was a biologist, Laurence Irving. He is a man of broad vision and a true lover of the Arctic. To him fell the critical tasks of defining the first contractual relationships between ONR and the sponsoring educational institution, in that case Swarthmore College. The operating arrangements between the sponsoring institution and the director in the field at Barrow; the multitude of relationships with ARCON, the Pet 4 prime contractor; the Officer in Charge of Construction of Budocks at Fairbanks and the Resident Officer in Charge of Construction for the oil-exploration program at Barrow, also were his immediate concern. In addition he largely designed the operating pattern between the director and ONR; he established the first research program; developed liaison with the local people at Barrow and with the local airlines — I could go on and on.

2. In July 1949 George MacGinitie took the wheel. MacGinitie is a marine biologist of great stature and broad experience. At NARL he had a common touch that endeared him alike to visiting generals and ambassadors, to tractor drivers and Eskimo workmen, and to laboratory scientists and itinerant research supervisors. He is quite a man — kindly, gentle, sympathetic, humorous — but tough as hickory when necessary.

3. Just over a year later, in August of 1950, MacGinitie was followed by Ira L. Wiggins, distinguished botanist and Head of the Natural History Museum of Stanford University. Many difficult problems arose during his regime and he faced them squarely and unequivocally. In the research field he stood out in his chosen discipline but also he had an uncanny appreciation of the problems of

others in different disciplines and, as director, cheerfully shouldered their burdens too. As I will mention later, Wiggins really had two tours as director, but I am introducing him only once. Wiggins remained as director until the end of January 1954, the longest tour of duty for a director up to that point.

4. Then came my old and good friend, Ted C. Mathews, an engineer, and the only non-scientist to hold the position of director. Ted came on board at the end of January 1954. At that time the contract for the operation of NARL was made with the University of Alaska along lines planned by President Terris Moore but finalized by his successor, Ernest Patty. Pet 4 had been terminated only a few months before and new arrangements had to be made and new relationships established. Ted had been a key figure in ARCON throughout most of Pet 4 and had served with distinction. He knew the background intimately, and he brought the ship onto a new course in a new environment and one that soon began to log an impressive record of accomplishment.

5. About mid-April 1955, Matthews was relieved by Dr. G. Dallas Hanna, a geologist of admirable breadth and understanding from the California Academy of Sciences. His inquiring mind probed deeply many obscure corners that were wonderfully illuminated thereby. In addition, his genius with instruments and his manual dexterity were widely acclaimed and most useful. He and his wife were well loved in Barrow and his tour was one of notable progress.

6. After Hanna, Wiggins returned again, as I have already mentioned, for about 6 months from the end of March 1956 to the end of September of the same year. And so to the bridge at the end of September 1956 came Max C. Brewer, and he is still firmly in command at NARL. I first knew Max Brewer as a young, promising geophysicist in the Geological Survey who became involved at NARL in a permafrost project. Soon his interests far beyond his own project became abundantly apparent. Then he became the director and now he is in fact generally recognized as Mr. Arctic or Mr. Barrow, and he has done an outstanding job.

The record of NARL is replete with accounts of situations, incidents, and crises that reflect somewhat the atmosphere of the local environment, the excitement, the occasional dangers, the feeling of accomplishment, the humour, and some of the rewards of being a part of the activity. I want to pass on to you four of these accounts in which the wording has been modified only slightly from the original reports in order to try to give you the feel of life and work at NARL.

The first is the final chapter in the abandonment of ARLIS I, a floating station on sea ice that by late March 1961 had drifted 615 miles since its establishment in September 1960 to a position some 300 miles northwest of NARL. As the winter wore on it became apparent that the station was in an area of weak ice and would have to be abandoned. The seven men aboard were in an increasingly difficult situation. The report goes on: "cracking became more serious near the end of the year (1960). One fracture crossed the runway and passed close to the camp. Another went under the fuel dump, and still another opened nearly six feet between one hut and the kitchen-mess hall. There was no ice within two miles of the camp that could serve as a runway for heavy aircraft but the Cessna's could

still operate in the camp area." The station was abandoned on 25 March and the report describes the operation: "some idea of the task is best described by the team's actions in the last hour and a half on station. The R4D aircraft homed on the beacon, buzzed the camp, and landed on a refrozen lead one and a half miles away. The generator used for the beacon was immediately shut down and the group left for the airplane pulling the generator on a sled behind the weasel. On arrival at the plane, the generator, weighing 2300 pounds was dismantled into three sections and loaded aboard the aircraft. The weasel transmission, a scarce part at Barrow, was removed and, with 1700 pounds of other freight, was loaded. The men climbed aboard and the plane took off. The entire operation took only ninety minutes and the R4D kept one engine running the entire time."

The second account was of an incident relatively early in the course of NARL's activities. It was midwinter and a visiting Fairbanks musician was giving a concert in the Barrow Presbyterian Church attended by the local Eskimos and visitors, many from NARL, to a total of around 400 people. Highlights were reported as "a NARL researcher amusing a restive Eskimo baby during a rendition; two smacking reports from a cap pistol fired by a fun-loving chap in the back row; the large baby chorus that picked up each refrain; and the crowd stepping carefully over sleeping children as the Church was cleared after the concert."

October 1963 was the month of "the storm." The storm was without parallel in the recorded or legendary history of the area, although a series of heavy storms occurred in 1964. The report goes on: "the peak of the storm occurred between 1400 and 1600. Water rushed through the camp reaching a depth of 24 inches in front of the main Laboratory complex and as deep as three and a half feet in other areas. Building 161, the beachmaster's hut, the theater, and F-5 were moved off their foundations and the 40 x 100 foot gym collapsed. Building 161 came to rest out on the tundra behind Building 355. Salt water poured into Fresh Lake in a stream 2 feet deep and as wide as the distance between the camp and the airport. All women and children were evacuated from the camp to the DEW Line site. The force of the current through camp was so strong that only tractors could be driven through the streets. A wolf, two wolverines, and three foxes drowned in this period. One weasel and one tractor were sunk trying to save the animals."

And finally a comment or two about visitors to NARL; the constant coming and going of distinguished visitors was, and is, a common feature of life there. A high point of some sort in this respect occurred in mid-July 1965. Several Air Force and Navy officers arrived on the evening of the 14th. The next day, while the earlier visitors were still there, the Canadian Coast Guard ship *Camsell* arrived for several days stay. At 1300 on the 15th a group of high ranking military officers and university presidents arrived overhead and landed after 45 minutes circling because of a low ceiling. A Navy aircraft with Senator Ernest Gruening and the Commandant of the 13th Naval District appeared at 1515, circled because of the low ceiling and landed at 1630. "That one was rough," the director reported. "On their final approach the hydraulic line on the plane ruptured, the plane landed with only half the normal flaps, they pulled the emergency brake, blew four tires, and one set of wheels plus the nose wheel of the C-54 ran off the runway and

buried themselves in the loose gravel. No one was hurt and we unloaded the Senator and the Admiral down the ladder in a completely unflattered condition."

And so it has gone for nearly 25 years. In the words of a former president—"let's look at the record."

About 1500 persons played a significant role as individual researchers or as members of research teams up through 1966. Many of them were repeaters—that is they worked out of NARL during more than one season. Over all there were 784 projects through 1966—of which 393 were new and 391 repeaters. Of those 393 new projects, 191 were in the physical sciences and 140 in the biological sciences. The remainder were mostly in the social sciences with a few in such fields as development, testing, and engineering.

Seventy-four North American universities have been represented by principal investigators or research teams. They include 4 Canadian universities. The 70 U. S. universities are in 32 states and the District of Columbia. Incidentally, the University of Alaska has had more projects than any other university: 69. Also represented have been 4 Japanese universities, 2 Danish, 2 English, 1 Swedish, 1 German, 1 Irish, and 1 Brazilian.

Also participating have been many semi-educational institutions like the Riksmuseet of Stockholm, the National Museum of Canada, the National Science Museum of Japan, the New York Botanical Garden, the Smithsonian Institution, the California Academy of Sciences, the Woods Hole Oceanographic Institution, and the Scripps Institution of Oceanography.

Many Government agencies also have used NARL as a base for projects. Among these are the Office of Naval Research, the Naval Electronics Laboratory, the Naval Civil Engineering Laboratory, the Naval Ordnance Laboratory, the Naval Underwater Sound Laboratory, the Bureau of Yards and Docks, the Naval Oceanographic Office, the Naval Mine Defense Laboratory, the Army Corps of Engineers, the Army Materiel Command, the Walter Reed Army Medical Center, the Air Force Cambridge Research Laboratories, the Air Force Aeromedical Laboratory, the Geological Survey, the Fish and Wildlife Service, the Department of Agriculture, the Environmental Science Services Administration, the Coast and Geodetic Survey, the Weather Bureau, the National Bureau of Standards, the Public Health Service, the Arctic Health Research Laboratory, the National Institutes of Health, the Atomic Energy Commission, and the National Aeronautics and Space Administration.

ONR should, and I am sure does, take deep pride in what was one of its first major efforts, for the office itself was very new in 1947. NARL's accomplishments, the patterns it has set, its many successes that far outweigh its few inevitable failures, must be viewed with great satisfaction. Its presence today on the platform of rapid development of northern Alaska where the results of its earlier work are so urgently needed and so gratefully applied is indeed opportune.